

Notice of Allowability

Application No.

10/816,495

Examiner

William T. Leader

Applicant(s)

CAO ET AL.

Art Unit

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the papers filed on November 13, 2007.
2. ☒ The allowed claim(s) is/are 1-11.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date 3/31/2004
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

Receipt of the papers filed on November 13, 2007, is acknowledged.

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows:

A new Abstract has been provided on the attached page.

COMMENTS


The abstract has been amended to more completely summarize the invention. The added material is based on figure 3.


The following is an examiner's statement of reasons for allowance:

The amendment to claim 1 is deemed to overcome the rejections of record. As indicated in paragraph [0004] of the specification, it is known to measure resistance between the contact points near the edge of a wafer to determine whether a wafer has seed layer coverage on the edge. Claim 1 has been amended to recite the steps of determining a reference resistance of an electrochemical deposition cell including

a reference wafer and determining a calibration resistance of an electrochemical deposition cell including a calibration wafer. One embodiment of an electrochemical deposition cell is illustrated in figure 2 as element 230 and described in paragraph [0022]. The cell includes wafer 220 in contact with a cathode electrode as well as an anode and a plating bath. "Reference wafer" and "calibration wafer" are described in paragraph [0024]. The prior art does not suggest determining a reference resistance and a calibration resistance of an electrochemical cell as now recited and then selecting an error trigger based on a comparison of these resistances.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."


William Leader
January 3, 2008


SUSY TSANG-FOSTER
SUPERVISORY PATENT EXAMINER

ABSTRACT

A method and apparatus are described that use cell voltage and/or current as monitor to prevent electrochemical deposition (e.g., electroplating) tools from deplating wafers with no or poor metal (e.g., Cu) seed coverage. In one embodiment, the voltage of a plating cell including a reference wafer which has substantially complete Cu seed coverage is measured. A reference resistance of the plating cell with the reference wafer is determined. The voltage of the plating cell including a calibration wafer which has no or insufficient seed coverage at its edge is measured. A calibration resistance of the plating cell with the calibration wafer is determined. An error trigger based on a comparison of the reference resistance with the calibration resistance is selected.